NASA TECH BRIEF

Langley Research Center

Theoretical Prediction of Interference Loading on Aircraft Stores: Part II – Supersonic Speeds

The problem:

Accurate prediction of interference loads on pylon-mounted aircraft stores.

The solution:

A program was developed for theoretically predicting the loading on pylon-mounted stores in supersonic flow.

How it's done:

Linear theory is used, without two dimensional or slender body assumptions, to predict the flow field produced by the aircraft wing, nose, inlet, and pylons. Aircraft shock wave locations are predicted, and their effect on the flow field is included through a transformation of the aircraft geometry. The interference loading is integrated over the store length by considering the local crossflow, its axial and radial derivatives, and buoyancy. Store moment calculations under an F-4 aircraft at Mach 1.2 are compared to wind tunnel data. The method is computerized, and program user information is included. A companion Tech Brief (see notes) discusses a similar program for subsonic speeds.

Notes:

1. This program was written in FORTRAN IV for the CDC-6400 computer.
2. Reference: Theoretical Prediction of Interface Loading of Aircraft Stores, Part I – Subsonic Speeds, NASA Tech Brief B73-10184.
3. Inquiries concerning this program should be directed to:

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   112 Barrow Hall
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General Dynamics
under contract to
Langley Research Center
(LAR-11250)

Category 06, 09